Graef (H. A.) & Wiebe (Edw.)

THE

MEASURE WORM,

("ENNOMOS SUBSIGNARIA"—HÜBNER.)

A DESCRIPTION OF THE INSECT,

IN ALL ITS

METAMORPHOSES,

ITS HISTORY AND PROGRESS, AND A SYSTEMATIC PLAN FOR ITS FINAL EXTERMINATION,

TOGETHER WITH

REMARKS ON THE STATE OF SHADE TREES IN THE CITY OF BROOKLYN,

BY

H. A. GRAEF & EDW. WIEBE.

PRECEDED BY

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INTRODUCTORY NOTE.

The following Report on the "Measure Worm Nuisance," with the means of abating it, has been prepared by Messrs. Graef and Wiebe of this city, has been submitted to a large committee appointed by the Brooklyn Horticultural Society, and has been by that committee directed to be published. In introducing it to their fellow citizens, the undersigned, who have been constituted a sub-committee for this purpose, solicit for it the candid and careful attention of those whom it may reach. It has been prepared with an industrious patience, and it contains suggestions and information, which at least deserve such attention from its readers. It is hoped, also, that it may enlist the earnest interest and the effective co-operation of those who read it, in the efforts which it proposes for ridding our beautiful "City of the Heights" of an offensive feature which, for several years past, has to a great extent robbed its streets of their pleasantness in the early summer, and which threatens, unless removed, to convert the shade-trees that have heretofore been its ornament, into objects of general and proper disgust.

It would seem to be entirely unnecessary for the committee to urge upon those who have been constrained to traverse our streets in the latter part of June and the early part of July, the great importance—they might almost say the necessity—of devising and accomplishing *some* plan for removing the worms which dangle before their faces, are dropped upon their clothing, or are crushed by their feet at every step. Certainly no gentleman, no lady, can need to be convinced that carrying these worms from house to house, brushing them out of the face and hair, or stopping at the corners to pick them off with the fingers—at the risk of crushing them in the experiment—is not a part of the privilege which one looks for in becoming a resident of a city like this. The most menial offices for which

servants are hired become almost positive luxuries in comparison. Nor can it be necessary, either, to urge upon the owners of property in the city the importance of such a plan to their pecuniary interests, to say nothing of its relations to their personal comfort and to that of their families. Such shade-trees as ours are to a city what the hair is to the human head; its natural drapery, its crowning ornament. And to have these graceful and luxuriant tresses of foliage, which shelter and shadow our stony pathways, either swept away from them, or converted into dirty cobwebbed nests of filthy vermin, would be a great disaster, as well as a disgrace. Business must be diminished by it, as well as pleasure. The attractiveness of the city as a place of residence must be seriously impaired, and its whole prosperity be, in the end, seriously affected.

The only question is then, or ought to be, whether the plan proposed by the gentlemen whose Report is herewith submitted, is likely to prove at once economical and efficient. And in regard to this question, the undersigned can only say that it seems to them nearly certain to be successful in removing the obstinate and still-extending nuisance from our streets, at a comparatively small expense to each owner or occupant of a house; far more likely, at least, to do this, than any other plan which has been hitherto tried or suggested. It contemplates, as will be seen, quite a number of practical measures, each of which is important in its place, and which in the aggregate will, we think, be entirely and permanently effective. We have really *no doubt* that if these measures should be generally adopted and persistently carried out, the worms would, in a year or two, be practically extirpated; and that thus our city would present itself as it ought, to citizens and to strangers, not bald and bare of its fairest ornament, nor yet disgusting as for some years it has been, in this sprawling, wriggling and slimy filthiness, but everywhere attractive in the purity of its air and the fresh cleanliness of its embowered streets and squares.

With these brief remarks the Committee submit the Report, the publication of which has been entrusted to their care.

R. S. STORRS, Jr.
E. S. MILLS.
CHAS. E. WEST.
J. GREENWOOD,
JOSEPH B. JONES, M.D.

INTRODUCTORY REMARKS.

Some twenty-five years ago a number of white mulberry trees (*Morus alba, L.*) were planted in this city for the purpose of trying to raise silk, and when, almost cotemporaneously with this event, and in close proximity with these trees, the so-called measure worms were discovered, people were inclined to think that a certain relation between these two facts might exist.

Some held that the eggs of the insect were imported with the trees; others took even the measure worm for a variety of the genuine Asiatic silk-worm, which, in consequence of change of climate and food, had become very much degenerated.

The measure worm is, in all probability, a true native American, and if it had not been observed previously to the planting of the mulberry, twenty-five years ago, the reason may be found in the fact that in those early days there were living in Brooklyn a smaller number of entomologists than at the present time; and the best reason why the insect did not then prove detrimental to the shade trees, is, undoubtedly, because there were few, or none at all, to be destroyed.

However this may be, it is recorded in the history of our city, that with its extension, and the larger number of shade trees planted, the devastations of the insect have always kept pace.

The spot where, in Brooklyn, mulberry trees were first planted and the measure worm was first discovered, was on the Heights. In the early years of their appearance they occupied only a very limited area. Each following spring added to its dimensions, and the outposts of this, now so formidable, enemy have been pushed forward already as far as Clinton avenue to the east, and Hamilton avenue in a southerly direction.

The fact that every year is not alike productive of this noisome insect is based on the nature of the animal. Dry and warm weather favors, and cold and damp weather checks, its development materially; the amount of destruction therefore

is, in some respect, dependent on the weather in early spring. Although we have no reason this year to complain of scarcity in worms, their devastations would certainly have been ten times more if we had not had such uncommonly cold spring-weather. A still greater effect is to be attributed to the frequent cold, heavy and long-continued rains, whereby millions of measure worms have perished, being forcibly removed from their hiding places, drowned and carried off through the overflowing gutters.

Who knows what the next year may have in store for us? Perhaps sooner than we imagine, our parks and gardens in and around the city, and the unsurpassed beauty of our world-renowned Greenwood, will fall a prey to the voracity of a pest hardly less obnoxious than the locusts of old, and certainly inviting to a most energetic and persevering war of destruction.

It is natural that this most alarming state of things should have years ago occupied the minds of citizens of Brooklyn who were desirous of devising means to check the progress of this noisome insect, none of whose plans for its extermination, however, have ever met with any degree of success. A resolution of the Common Council in 1860 to free the city from the perpetually increasing measure worm nuisance, even by removing from our streets all trees infested by the insect, could hardly have been passed, if the city authorities had not been satisfied that it would be far better to deprive the city of half its beauty, than suffer it to be destroyed entirely, a few years later.

Being conversant with all these facts, and desirous to contribute our mite to preserve not only the present beauty of Brooklyn, but, if possible, add to it, we have made this subject our careful study, and take pleasure in laying before you the present communication as the result of our labor. Our treatise gives a minute description of the animal in all the different phases of its development, according to our own observation. In our system for the extermination of the insect, we avail ourselves of all its weak points to carry on our plan of continued warfare.

May our endeavors be received with that degree of forbearance which is desirable for the works of those who, however great their zeal and perseverance may be, never claim to be infallible.

The insect which for many years past has proved so destructive to the foliage of our most beautiful shade trees; which, on that account, has been so frequently the object of public discussion, complaint and apprehension, and the extermination of which seems now to have been resolved upon with all possible zeal and energy, appears in four different metamorphoses, viz.:

1. As egg. 2. As caterpillar (*larva*).
3. As aurelia or chrysalis (*pupa*); and,
4. As winged butterfly (*moth or miller*).

1. As eggs they are deposited by the female moth toward the beginning of July, not only on trunks and branches of early thriving trees, but also on numerous other objects, to the number of from 20 to 250, in the shape of irregular clusters. During this period they are of about the size of a small pin's head, conical in form, and somewhat compressed at their points; first of a yellowish, then of a light or olive green, and later of a dark brown. They are covered with a thick, sticky, glueish matter and adhere strongly to the object on which they are deposited. They are usually found on the lower side of branches, and almost always below the connecting points of the same, apparently for their better protection and with the design of opening several avenues for the young brood to find subsistence. The number of eggs generally decreases from the basis of the branches toward their extremities.

In this state the eggs remain unaffected by rain or frost, seemingly unchanged, until the time when our shade-trees unfold their first leaflets, which (subject to the weather) is usually between the 15th of April and the 15th of May.

2. Little caterpillars then creep from these eggs, eagerly enjoying the rays of the sun on warm days, and carefully hiding themselves under the young foliage for protection on cold and stormy days. Here we find them in countless numbers crowding together, until after a very brief period they engage in their work of destruction. The young caterpillars always creep towards the extremities of the branches, led by their instinct to find there, first of all, the means for their subsistence, and make a retrograde movement only if they meet with any obstacle. They then devour the young foliage as quickly as it

develops, so much so, that often a fortnight suffices to render a tree entirely leafless.

If this occur before the worms have reached their full growth, they descend to the ground by means of silk-like threads, which they spin, apparently from their mouths. (In fact this thread producing matter issues from two holes, immediately above their mouths.)

After having reached the ground they creep in all directions until they meet another tree or shrub, which they ascend in order to re-commence there their work of destruction with renewed, and by a short time of fasting increased, greediness.

The trees are thereby not only deprived of their natural beauty, but other, and more serious consequences for the life of the tree result therefrom.

If, as late in the spring as the middle of June, trees are stripped of their foliage, it will be observed, about the middle of July, that fresh, quite tender little branches begin to sprout, producing fresh leaves. The sap of the tree, intended to enlarge the *thickness* of its trunk and branches, and thereby to enhance the *strength* of the tree, is in such way employed to reproduce twigs, not provided for by nature, which in consequence thereof, always remain very slender, and from want of strength, usually bend downward.

Frequently it also occurs that the wood of such twigs does not ripen enough to withstand the influence of an early frost, and they consequently must perish.

During the time of their development the caterpillars cast their skin three times, and appear, after the first peeling, light green or gray; after the second, light-brown or olive, and after the third, dark-brown with irregular yellow spots and stripes. Immediately before and after these changes the caterpillars are inactive and apparently sick.

If the caterpillar has reached its full growth it measures from one to one-and-a-half inch in length, by from one-twelfth to one-eighth of an inch in thickness. Its body is smooth and cylindrical. Its light-brown head is somewhat thicker than the body of the insect, and provided with exceedingly powerful labial palpi, with which to seize and grind its food.

The insect has five pair of legs, three of which are quite near its head, fully developed and of a horny substance; the two

others, near the hinder extremity, are leg-like glands, by means of which they adhere so tenaciously to their object, as to be able to raise themselves perpendicularly, and permit themselves rather to be torn to pieces, than to give up that hold.

In consequence of the separated positions of its legs, the insect's long, soft body is entirely without support in its middle. If this caterpillar were to creep like most of the other species, its unsupported body, when moving horizontally, would be dragged along and must be injured by sharp objects in its way. To avoid this a particular movement was provided for these insects. They stretch the fore part of their body as far as they can or wish to reach, attach their front legs to their object, and draw their hind legs close to the former. In so doing they always describe the form of a horse-shoe, and seem to measure the surface of the object on which they are creeping, which particularities have given rise to their name of measure worm (*Geometra*) or inch-worm.

From certain organs, immediately under the skin on the backs of the caterpillars, (as microscopic observations have disclosed,) these insects are able to spin their silk-like threads, by means of which, as already stated, they descend and ascend the trees at their option. Frequently they remain suspended for a length of time, halfway between the branches of the trees and the ground, apparently waiting for the moment when digestion has rendered them less heavy for the task of remounting their former more elevated position.

On account of its thread-spinning ability, this caterpillar has sometimes been honored with the name of "silk-worm," and has by others been called "black-worm," on account of its dark color.

For their perfect development the caterpillars need from five to six weeks, during which period they sometimes eat daily more than ten times their own weight. Then it is when they are most troublesome to us, partly, and chiefly, by their destruction among our shade-trees, partly by the considerable amount of an unpleasant matter which they drop, and last, but not least, by the terror which, in their state of suspension, or dropping from the trees, they are apt to create among our ladies.

After the caterpillar is fully developed, and has, in the meantime, accomplished its work of destruction, it enters its chry-

salis state. When ready to be metamorphosed, it selects a safe place of refuge, either in the leaf-remnants, or on the trunks and branches of the trees, on fences, railings, lamp-posts, or almost anything it happens to reach. Here they enclose themselves in a texture, irregular in shape and net-like, and remain there, without any food, apparently lifeless, faithfully expecting the hour of their resurrection.

In this period they form into a pupa, (*aurelia, chrysalis,*) half an inch in length, of a conical form, and of a gray or brownish leather-color, dotted with numerous black spots on its back extremity. After the expiration of 10 or 12 days, these pupæ have finally reached the last stage of their existence. They burst the hardish case in its front part, and out comes the winged animal, miller or moth, in science known under the names of *Ennomos subsignaria* (Hubner), or *Geometra niveosericearia* (Harris).

4. The wings of the new-born insect develop very rapidly. Soon after being released from its imprisonment the moth is seen, sitting quietly on the lower surface of objects drooping its wings, apparently that they may become by their own gravity, entirely unfolded, and developed to their full length. Subsequently the females are observed in well protected places, incessantly shaking their wings, as it were, to attract the attention of the male insect, and then the sexes pair, whereupon the female, as previously stated, deposits her eggs and soon after dies. The male miller, the smaller of the two sexes, is lively and has combed or feathered, but the female is larger, thick-bodied and sluggish, and has thread-like antennæ. The former generally lives a few days longer than the latter and both are said (in the opinion of most authors,) not to take any food whatsoever. But as nature has provided these millers with perfectly developed probosces, certainly not without a design, it remains doubtful whether they do not take some food during the night on trees, when it is difficult to observe them.

It is truly a strange freak in nature, to lavish so much time in creating a being, which, in its perfect state, exists only from 8 to 10 days, while it requires nearly 355 days for its development.

The above statements will probably suffice to give a clear perception of all that pertains to the insect in question, as to its mode of living in all its transformations. But we deem it

necessary, before communicating our plan for the destruction of the measure worm, to allude briefly to the degree in which the different species of shade-trees are subject *to*, and suffering *from*, the depredations of this insect.

If it must be acknowledged that rows of well cultivated trees on sidewalks are pleasant and useful ornaments to any city, it must be admitted also that, beside the above mentioned indisputable disadvantages, caused by the measure worm in our city, the greatest of all is perhaps, that with the view of checking the depredations of these pests, a number of beautiful trees have already been cut down and the inclination to plant and cultivate trees has subsided very materially.

On the sidewalks of our city we find 18 different species of shade-trees in such proportions as have been denoted in the following list after each of their names : *

1.	Tilia europæa, (European Linden),	14 per cent.
2.	Acer dasycarpum, (Silver-leafed Maple),	8 "
3.	Acer saccharinum, (Sugar Maple),	2 "
4.	Ulmus campestris, (English Elm),	9 "
5.	Aesculus hippocastanum, (Horse Chestnut),	4 "
6.	Salix americana, (Weeping Willow),	2 "
7.	Populus alba, (Silver-leafed Poplar),	1 "
8.	Fraxinus excelsior, (English Ash),	$\frac{1}{8}$ "
9.	Gleditchia triacanthos, (Honey Locust),	1 "
10.	Ailanthus superbus, (Ailanthus),	$43\frac{5}{8}$ "
11.	Catalpa syringaefolia, (Catalpa),	2 "
12.	Cupressus disticha, (Cypress),	$\frac{1}{2}$ "
13.	Larix europæa, (European Larch),	$1\frac{1}{2}$ "
14.	Liriodendron tulipifera, (Tulip Tree),	2 "
15.	Morus papyrifera, (Paper Mulberry),	$\frac{1}{2}$ "
16.	Paulownia imperialis (Imperial Paulownia),	7 "
17.	Platanus occidentalis, (Buttonwood),	$1\frac{1}{2}$ "
18.	Robinia pseudacacia, (Locust),	$\frac{1}{4}$ "

Among these 18 species of trees the 9 first named ones may be designated as chiefly subjected to the depredations of the measure worm, and in such a degree as they follow each other in the list. The species enumerated under the figures from 10 to 18, are never attacked by young caterpillars, but are visited only in cases of necessity. If one tree in the neighborhood has been entirely stripped of its foliage before the caterpillars, that were born on it, have become fully developed, they migrate to

* The map prepared by us, and alluded to on page 12, served as a foundation in designating these proportions.

the next tree, to satiate their craving hunger and to escape premature death from starvation. Under such circumstances no tree, of whatever description it may be, is safe from their attacks.

Not all the species of the above-named shade-trees, as is well known, bud at the same time. Some of them, as Linden, Maple, Elm and some others are always a fortnight earlier than Ailanthus, Paulownia, Sycamore, &c., and the young caterpillars always keep pace with the early ones. The moths, then, follow only their natural instinct in depositing their eggs almost always on Linden, Maple and Elm trees. And, when we catch a female miller, selecting an Ailanthus, Sycamore or even a lamp-post on which to perform her sexual duty, we may rest assured that from some physical cause she was prevented from acting according to her natural instinct. For, should the caterpillars creep out before the leaves appear, they would only begin to live in order to die for want of food.

The hatching of the caterpillar eggs is dependent on the same cause, which also circulates the sap of the trees, namely: a sufficient degree of warmth. Warm weather early in spring calls forth early foliage and with it the innumerable hosts of young caterpillars. If warm weather sets in later both are retarded accordingly.

In planning our system for a successful extermination of the measure worm from Brooklyn, we have found it indispensably necessary to draw a correct map of the whole part of the city in which the insect has made its appearance thus far. On such map each and every tree will be marked by the initials of its species in its exact position as to house or lot in every street and avenue. The degree in which it has been infested by the worm will be indicated thereon by the figures from 1 to 5, and its dimensions, the consequent amount of labor and expence to be bestowed on it, by the letters from a to k.

According to these principles we have prepared a map of the district bounded by Joralemon, Fulton and Clarke streets and the East River. Finding, as we do, on this map, opposite No. 20, in Pierrepont street, the letters and figures "A. A. 0. 0. g. g." these indicate in front of house No. 20, in Pierrepont street, two Ailanthus trees of large dimensions and free from measure worms. Opposite house No. 4, same street, "H. 4. f." mean:

Horse-chesnut tree, strong and high, in the fourth degree infested by the measure worm ; and opposite house No. 60, same street: " T. 5. h." tell us that the foliage of a Linden tree (Tilia) of largest dimensions has been entirely destroyed by the insect.

To direct an undertaking of this kind with any hope of success, would be possible only on the basis of such a plan and without its assistance it would be an utter impossibility, even to the most just of experts, to compare the present condition of the trees with that of any future time.

Being convinced that with the aid of such correct map we know *the strength* of our enemy and *where* to attack him ; it afforded to us the basis in laying down *our system* and *devising the weapons for a war of total destruction against* the troublesome insect, which is the subject of this essay.

As to the means and ways proposed by us, we remark that most of them have already proved practical and efficient. For some others however, we have made use of hints and the experience of other persons, who have also made the subject their study, and the merits of which may soon be ascertained.

If our plan of destruction should be adopted and carried out, we would immediately begin our work with scraping the measure worm eggs from all the trunks and branches of the infested trees.

By such procedure we removed a short time ago from one small maple tree in Fulton avenue, near Elliott place, at least 60,000 fruitful eggs, which we exhibited at the meeting of the Committee on shade-trees of October 20th. This scraping of eggs from trees can be performed through almost all the winter season. During the latter half of April or somewhat before the young caterpillars begin to creep out, tar-rings, four inches wide, are to be applied around the trunks and stronger branches of trees in proper places. These will not dry in a fortnight and all small twigs below them are cut, to have no leaves appear in such places. By such means the young brood must starve to death, as they are separated by the tar from their food, and in trying to pass it, they unavoidably will adhere permanently to the sticky matter. Such caterpillars as may be found beyond the tar-rings, crowding together as long as they are small, in large numbers on single leaves or branches, are to be removed, together with leaves and twigs, by means of hedge-shears.

Such as may escape these operations will be syringed with a strong tobacco infusion, or are destroyed still later by daily repeated beating or jerking of the trees and branches by means of proper tools and machinery. The heavier the caterpillars grow the more effective this last method of destruction will prove, as it is well known, that if suddenly attacked and surprised, they give up their hold and drop to the ground in large numbers. Such caterpillars as should escape all these prosecutions and reach the time when they enter their chrysalis state, are to be gathered as cocoons from their hiding places and destroyed, as will be done with the millers, which, in spite of the most careful attention, perhaps may come to perfection. As soon as they appear, they will be caught in nets, or syringed on the trees, like the caterpillars, and will drop by jerking the trees and branches. Some of the male millers will perhaps escape during these proceedings; the more sluggish and heavier females, however, will certainly fall and can be easily destroyed.

No one will deny that by such an uninterrupted warfare, carried out with energy and circumspection against this insect through all its metamorphoses, its numbers must, as a matter of course, be reduced in a short period, very considerably, and if we should perhaps not reach our aim in one season, it will undoubtedly be done in the following one.

In our original plan and report we have treated more extensively on the means and ways of our plan of destruction, adding models and drawings of our apparatuses, which here, however, for brevity's sake, may be omitted.

We have also proposed to enlist the co-operation of our dear little wrens in our work of destruction, and wish that these, our intended allies, may be cultivated and protected in such a degree as they deserve. We have therefore introduced a very simple, but exceedingly useful, cheap and lasting wren-house, one of which, with nest, we exhibited at some of our former meetings. A large number of these houses should be placed in the trees of of our city, and a cordial invitation extended to the birds to occupy them, and to feast upon the millions of worms at their immediate disposal. If they should accept our call, this would be of vast importance for the future. In the beginning, it is true, a small number of birds could render only little service for the destruction of millions of worms. The proportions, how-

ever, might soon be different. If, by human skill and perseverance, the worms were reduced to a very limited number, and the birds should be allowed to dwell among us and to multiply considerably; the case might occur, that after a few years a measure worm would be a scarcity in Brooklyn, now suffering so extensively from the depredations of this noisome insect.

It need only be mentioned, that for the better protection of these little benefactors, our Common Council should pass an ordinance the strictest observance of which would have to be carried out. The great advantage which confidently may be expected from these welcome little guests, in regard to the destruction of all different kinds of insects, is much more important than is usually believed. We know of places in the vicinity of Brooklyn where the owners of gardens could not successfully cultivate certain plants, until they had secured the assistance of wrens for the destruction of worms, by establishing, gradually, large numbers of houses for them on their premises.

Wrens are in the habit of returning to their old habitations and young wrens are known to prefer taking quarters in the neighborhood of their birth-place, if they have been treated kindly there. Besides houses these birds need drinking and bathing places. These also should be provided in the shape of flat earthen vessels, one of which is to be placed in each block, in a proper, quiet place, where it may remain undisturbed by cats, and filled with water once in twenty-four hours.

We have had frequent opportunities to converse with entomologists and other scientific and learned gentlemen about our system for the abatement of the measure worm nuisance and have had the satisfaction to hear them express their opinions about its feasibility in the most flattering terms.

Among those who have become acquainted with our plan, Dr. Trimble of Newark, a member of the original Committee on Shade Trees, has alone given a dissenting opinion. This gentleman deems it useless to expend even a single dollar for the destruction of the caterpillars, as according to his assertion, a little fly is destined by nature to perform this important service.

We would not have mentioned this fact at all, if Dr. Trimble had not published his dissenting opinion against us in the

Newark Weekly Mercury of Oct. 14th, and sent, or caused to be sent, copies of this paper to most of the members of the Committee on Shade Trees in this city.

We know as well as Dr. Trimble, the natural law according to which the existence of one species of animals is dependent upon the destruction of another, and that thereby only, since time immemorial, the necessary equilibrium in animal life has been sustained. But we are at a loss to understand how the learned gentleman can think that any natural law can hold good in the midst of a populated city, where obstacles of all kinds are thrown in its way to counteract it.

The cultivation in our city of shade trees affords the countless number of worms the best means for their development, and they are, in addition to this, indirectly protected against their natural persecutors and regulators, the birds, by the constant bustle of crowded thoroughfares, by which the latter are driven away beyond the limits of the city. The Doctor himself, in his published article, admits this to be the case. He says: "As the trees in the parks become larger, the birds come; they seem to be fond of city life. But in the meantime *the worms have got such headway as to be beyond their power to subdue them. Brooklyn is in that condition now.*"

Without deeming any refutation of Dr. Trimble's hypothesis necessary we simply ask:

1. Would it have been possible for the measure worms to increase every year since their appearance in Brooklyn and to multiply in such an alarming degree, if the Ichneumon fly had been able to exert any influence to check their progress?

2. If the Ichneumon fly, whose existence dates back as far as that of its enemy, could not accomplish this thus far, during a period when there were only few of the worms, on what experience of a parallel case, or on what other authority, is the Doctor's assertion founded, that this little fly will now, all at once, be able to successfully combat an enemy whose power has been extended gradually, during a period of twenty-five years, over the area of several large cities, and whose depredations have become such a detestable nuisance as to call loudly for a speedy abatement?

As practical men we prefer always to rely on our own exertions, and much more so in cases of urgent necessity as the

present one, disdaining and refusing every and all assistance from whatever fanciful agency it may be expected. "*Help yourself, and—God will help you!*" is our motto, and in this spirit we offer our services to our fellow citizens, leaving it entirely to their common sense to calculate and decide what practical benefit they can derive either from adopting a carefully and systematically wrought out plan, for the accomplishment of a certain object in view, or relying on vague speculations and hypotheses. These, being neither founded on experience, nor sustained by any logical conclusion, certainly never will stand the scrutiny of a clear and unbiased mind, which, in regard to our system, will be welcome at any time.

In passing through streets and avenues of our city for the purpose of ascertaining all particulars about the existence of the measure worm, we had an opportunity more favorable than ever before to observe our shade-trees, and regret to be obliged to declare that their condition, generally speaking, is a most deplorable one. Certainly not over 10 per cent. among them are found to give entire satisfaction.

The most remarkable fact which presented itself to our observation was the great mortality during the summer of this year, especially among the old ailanthus trees; and, without fear of exaggeration, we calculate the number of dead or dying trees, within the city limits to be 1,500 or thereabouts. In Columbia street, for instance, opposite Degraw, we found that in one block, 11 tall ailanthus trees had died; in Bond street, between Fulton avenue and Schermerhorn street, 17; in Myrtle avenue, between Adams and Bridge streets, 14; in Fulton ave., opposite Elm place, 6, etc., etc.

This fact will, however, appear less astonishing if we consider the manner in which our shade-trees are usually planted and treated afterwards.

The layer of top-soil within the city limits is very insignificant, and varies in depth from 8 to 18 inches. Under this layer is a stratum of sand, gravel, rock, or humus bare ground is found. In regulating the level of the city the top-soil has been removed from high ground, and low places are filled up with dirt of every kind, so that in very few instances, what little top-soil may be found, is left in its natural available condition.

In consequence thereof much larger holes than under ordi-

nary circumstances, filled with top-soil, are required if trees are to be planted, which can grow and prosper only until their roots have extended through this filled in top-soil, when they cease to grow, and eventually die.

In addition to this, the fact should be considered that hardly ever a drop of rain can penetrate to the roots of our shade-trees on side walks, as this is rendered perfectly impossible by the flagging of the latter and the pavement of the streets.

We have often examined the ground where trees had died and have always found it dry as dust. In order to remedy this we propose to provide every tree with an earthen urn with a hole in the bottom, to be placed in the ground, as close to the trunks of the trees as possible, and to be filled with water during the spring and summer seasons, once within 24 hours. Unless an artificial system of watering the trees be introduced at large, all of them will gradually fall a prey to this artificially created drought.

Next to this uncommonly large mortality among the shade-trees in our city the frequent lifting up and breaking of flags by the roots of the trees, attracted our attention. The roots of all trees concentrate and grow most rapidly where they find the largest quantity of food, which under here prevailing circumstances is next to the surface, particularly as the holes dug for them when planted, are very seldom filled deep enough with top-soil.

In consequencc of this raising and breaking of flags on side-walks, walking over such spots is rendered troublesome and sometimes even dangerous.

With a very great number of trees also it has been neglected to widen the holes in the flags around them at the proper time. This has caused incisions in their trunks, whereby they have become bloated, blasted, worm-eaten and rotten, and the germ has been laid to their premature decay.

Branches of many trees hang so low as to prevent a free circulation of air. They obstruct the view often to a great degree, and may become dangerous to those riding or driving through the streets.

Many trees contain such a quantity of dry and dead wood, old fruits and seed capsuls, that the eye of every observer must be offended. Others have formed on their bases many young

sprouts, absorbing much of the sap needed for the growth of the trees, harboring in the mean time vast numbers of troublesome insects.

Not seldom we find dead trees standing in a mouldering condition and also stumps of all varieties of size, which, apart from their ugly appearance, obstruct a free passage on the sidewalks.

Quite a number have been injured in their bark by horses or destructive human beings and have for all their life-time lost their good looks.

Many others, by their crookedness and obliquity are not only eyesores but prevent or obstruct free passage on the sidewalks as well as in the streets.

Many of those trees provided with boxes or poles have cut-grown the former and rub against them, or against the poles, injuring themselves thereby to such an extent that they can not prosper, if indeed they do not break in the thus wounded parts of their trunks.

In places where fires have occurred trees are often observed totally charred on one side and crippled.

Frequently trees are planted so closely together that one must necessarily crush the other, and sometimes, a large number of trees have been planted so carelessly, and have been neglected so thoroughly and constantly, that several of the above specified deficiencies are found combined in the same tree. Such trees, then, remain so miserable, that young trees, better attended to, would out-grow them in a few years.

Whoever will take the trouble to examine our shade-trees with a critical eye, will soon become convinced that our description is not an exaggerated one, as a mere comparison of the trees N. W. corner of Clinton, between Atlantic and State sts., will show. In this block is room for 10 trees. Instead of these we find there at the corner one stump 4 feet high, one of 1 foot high, four empty places, one half-rotten, abominable populus, not to be looked at without shuddering; two crooked catalpas and two ailanthus, which have raised the flags more than a foot. In Myrtle avenue, one of our most frequented thoroughfares, between Washington and Lawrence sts., where only 12 trees are growing where 80 might grow, there is among these 12 trees only one single ailanthus in a somewhat decent

condition, all the rest are either dead, dying or poor looking. And similar cases occur wherever we may examine our shade-trees critically. If we compare the condition of the streets mentioned just now, with that of a well-cultivated one, as Lefferts street, opposite C. J. Brevoort's, Esq., residence : does not the idea suggest itself that only care and attention are needed to improve the condition of the shade-trees in all our streets and avenues.

It is really astonishing to see how little attention is devoted to the culture of shade-trees in this city in general, and how long inconveniencies, obstacles and obstructions are suffered to remain before the necessary steps are made for their removal. Frequently the labor of a quarter of an hour, or a trifling expence at the proper time, would save the life of a handsome tree, and prevent great inconveniencies, if its owner be only possessed of a very limited degree of love for natural beauty, and could find time to think of such matters at all.

The reasons for the frequent neglect of our shade trees are, aside of the already mentioned measure worm nuisance, also to be found in the manifold little cares and attentions to be bestowed on trees, if we wish to see them prosper, which are not usually known, and if known, tedious to be performed.

In addition to these, the expences, accruing therefrom are also to be considered, particularly, as they are much higher than they might be if properly managed.

To illustrate : Somebody wishes some too-low hanging branches cut from his trees. He sends for a person, who does such work. The person comes to inspect the job, returns home to bring a ladder, and if this happens to be a heavy one, needs a second person to assist in carrying the same. Then he cuts the branches and carries his ladder home. The job itself, i.e. the cutting of the branches takes perhaps not more than half an hour. But to be paid for time lost a much too high price for so small a job has to be charged. Another instance : A stone-cutter can easily widen holes in flags around 50 trees in one day ; this would, at $3 per day, amount to only 6 cts. each, when never less than 25, nay, even 50 cts., are paid now for such job.

Thus it is with all little jobs, to be performed in course of time for the prosperity of trees, which could not only be done at a much lower expence, but carried out much more for the benefit of the trees and their owners, if attended to according to

a carefully arranged system and on a large scale, by some one who, with the necessary experience in such matters, combines a well-developed taste, and takes sufficient interest in the same.

Among our shade-trees there are five which had better be omitted in future plantings, for reasons stated hereafter, viz.:

1. The Silver-leafed Poplar. 2. Buttonwood. 3. Paper Mulberry.
4. Weeping Willow; and 5. Honey Locust.

The first-named tree grows too tall for the dimensions of our side-walks and streets, stretches its roots sometimes to a distance of 50 feet into neighboring gardens, depriving the same of every particle of manuring substance contained in the soil. Moreover it becomes very troublesome and annoying when in spring its seed begin to ripen. Not only in the streets, but also in houses, near which these trees are found, we have to inhale and swallow with our food, the wool in which the seed are imbedded, flying about. The seed thus carried on the wings of the air, is sown in a thousand places, where poplars never will be wanted.

Nos. 2 and 3 require more moisture than they can find on our side-walks, and therefore the extreme parts of their branches are mostly dead.

No. 4, notwithstanding its incomparably beautiful form in a free spot, is not admissable among shade-trees in streets, where the limited space is obstructed by it and a free current of air is prevented.

No. 5 can never be well attended to on account of its dangerous, long thorns.

Instead of these five objectionable shade-trees the introduction of the following seven would be advisable, viz:

Acer platanoides.	Betula alba.	Kohlreuteria paniculata.
Liquidambar styraciflua.	Magnolia acuminata.	Negundo fraxinifolium.
	Toxodium distichum.	

We would also recommend to pick the fruits from Horsechestnuts, Paulownia and Catalpa soon after blooming. By such procedure a quantity of sap, that otherwise is wasted, is saved for the better development of the trees, and above all it would prevent boys from climbing these trees, or beating their branches with sticks or throwing stones, all for the purpose of obtaining the useless fruit, by which means young trees are not only injured, but the birds are frightened away, for the introduction and protection of which we intend to spare neither care nor labor.

An ordinance of the C. C. should be passed, imposing a fine upon every one who should purposely and frivolously injure a tree, at least high enough to replace the injured tree by a new one.

We have also called the attention of our fellow-citizens to the dangers caused by the alarming extent to which the stinkweed (*Datura stramonium*) is spreading.

If these suggestions should be carried out, we feel satisfied that after a few years the state of sidewalks and shade trees in Brooklyn would be improved materially, and it would afford us the greatest pleasure having been instrumental in the accomplishment of this important improvement.

Among shade trees there exists a vast difference as regards the dimensions of their height and crown, as well as the shape and color of their leaves; in the catalogues of well-arranged nurseries, the degrees of their size are indicated, in addition to the description of trees.

All the different qualities of trees should be known to and well observed by any one who intends planting trees. The proper distance allowed a tree of the first size is from 15 to 18 ft., of the second from 13 to 15 ft, and of the third size from 10 to 12 ft. Our dwelling-houses having, at an average, a front of 25 ft., two middle sized trees for each would seem to answer the purpose best.

During our residence in Brooklyn we have witnessed the success of many a useful and beautiful enterprise, and are at a loss to comprehend how sidewalks and shade-trees could be left in so deplorable a condition for such a length of time.

[We have a Committee on shade trees, consisting of 55 of our most respectable and influential citizens. What shall prevent us from adopting a plan for the improvement of side-walks and shade-trees, so eminently calculated not only to contribute to the comfort and benefit of the hundreds of thousands traveling daily through our streets, but also to enhance the value of all real estate in the city ?

In addition to our proposal for the abatement of the measure worm nuisance in Brooklyn we offer our services also for the accomplishment of such improvements by removing, wherever it could be done, the obstacles and deficiencies mentioned by us in the above. We are prepared to remove useless, dead, trees, stumps and roots of trees; to cut too high growing roots, too low hanging, dead branches and sprouts, to have fruits and seed capsuls picked, to furnish young shade trees, uncommonly fine and strong, to have them planted, furnish top-soil, tree-boxes, water-urns, wrenhouses, of our own invention, repair flags, etc., all at prices lower than charged heretofore, and are willing, after the necessary improvements shall have been made, to keep shade-trees and sidewalks in good order for a small annual compensation and according to contract.

Parties wishing to avail themselves of our offer, and those desirous of further information in regard to matters contained in our report and plan, of which these pages form the outlines, will receive the same at any time at our office, 14 Court street.]